

# REVIEWS OF BOOKS

## BIOLOGY

**Deuchar, Elizabeth M.** *Biochemical Aspects of Amphibian Development*. London, 1966. Methuen (Monographs on Biological Subjects). Pp. ix + 206. Price 30s.

IT HAS ALWAYS been a main objective in most areas of experimental biology to formulate the problems in terms which allow them to be tackled, if not solved, by the methods of biochemistry and biophysics. Experimental embryology has followed the same path. It finds itself, however, in a position of considerable difficulty. It has been comparatively easy to translate such biological processes as digestion, metabolism or nervous conduction into chemical or physical terms. Even the processes of heredity—if one is content to reduce them to the mere transmission of “hereditary factors” from one generation to the next—presented no insuperable difficulties. Embryology, however, has at least one foot in the field of morphology, or form in entities of far more than molecular size. Most of morphological biology, which includes comparative anatomy and much of evolution theory, and which was for so long the central kernel of the subject, is still quite out of reach of physico-chemical methods. Embryology is on the borderline. Some parts of it, such as the metabolism of embryos, present no great intellectual difficulties, though still plenty of problems which are not yet solved. Needham’s monumental *Chemical Embryology*, published thirty-five years ago, provides sufficient evidence that this aspect of the matter is by no means unapproachable. Coming right down to the present day, the new methods, which go under the name of molecular biology, for the investigation of the synthesis of particular specified proteins and its genetic control, have recently been widely applied to embryonic systems, and we are clearly still in an early phase of an “information explosion” on these aspects of developmental processes. The difficulties arise when we try to face up to the problems, not of the metabolism or synthesis of defined molecules, but of the transformations

of highly complex cells or tissues. We find ourselves facing not merely end-products, in the form of differentiated cells, which are clearly of enormous complexity, but also a basic controlling system which is itself rather highly complex, since the DNA of the genes exists in higher organisms in the form of chromosomes which contain at least protein, RNA, and quite possibly lipid, and even carbohydrate, in addition to the nucleic acid which we should like to regard as ultimately the conductor of the whole orchestra.

The amphibian embryo was the favourite experimental material of embryologists for several decades after they first tried to find how to approach processes of cellular differentiation and morphogenesis in physico-chemical terms. It has also been the subject of extensive investigations on embryonic metabolism, and of some of the recent molecular biological approaches. Dr. Deuchar, in attempting a short monograph of about 65,000 words on the biochemical aspects of this type of embryo, has therefore taken on an exceedingly large task. She has acquitted herself very well. The material is clearly organized, largely in terms of the sequence of temporal stages. It will be useful to the biochemical readers, to whom the book will make most of its appeal, that there is a short and very clear outline description of the morphological development of the embryo, which provides a sound basis on which the later descriptions can rely. It is fortunate again that Deuchar has had the sense to begin her description of the embryo long before fertilization, i.e. with the formation of the ovum. In the very short term of one life history the cytoplasm of the egg is of little less importance than its nucleus, a point which is too often forgotten by enthusiastic geneticists. The coverage carries on from oogenesis right up to the time of metamorphosis.

The treatment throughout is well balanced in emphasis on different questions, and the facts and the interpretations put on them (and Dr. Deuchar’s evaluation of these interpretations)

are clearly and succinctly expressed. Attention is paid to items which appeared in the literature only less than a year ago. Naturally in the space available it was impossible to provide a complete coverage of all published items. The limitations of a short monograph have also made it necessary for Dr. Deuchar to be a bit cavalier in her treatment of some still highly controversial subjects, such as the relationship of mitochondria to the synthesis of yolk granules, or the interpretation of work with artificial inducing materials. There are a few places in which she does not seem quite to have grasped the crucial issues of the most recent work. For instance, there is no reference in the index to ribosomes, and her discussion of the nucleolarless mutant of *Xenopus* gives what has now turned out to be a rather misguided account of nucleolar function. However, it would be almost impossible for any book, even with the minimum time expended on its printing and production, to be fully up to date with the most recent advances. Dr. Deuchar's monograph will certainly provide an extremely valuable introduction to the whole subject, though the specialists will then wish to go to fuller accounts of the detailed fields which she sketches in.

C. H. WADDINGTON

### GENETICS

**Whitehouse, H. L. K.** *Towards an Understanding of the Mechanism of Heredity*. London, 1965. Arnold. Pp. xii+372. Price 55s.

IN RECENT YEARS there has been a tendency in some textbooks of genetics to allow modern ideas concerning gene action to overshadow the experimental evidence upon which basic ideas in genetics are founded. Little consideration for example, is usually given to the chiasmotype theory or to the evidence which led to the rejection of the idea that genes were discrete entities arranged on the chromosome like beads on a string. Dr. Whitehouse deals with these matters and many others in his book, the purpose of which has been to present the important evidence upon which current beliefs concerning the mechanism of heredity are based. The main emphasis is on experimental evidence and little space is devoted to speculation and conjecture.

The evidence presented covers the whole field of genetics. Roughly half the book deals with those classical experiments and observations which led to the basic concepts in genetics, the remainder is concerned with recent evidence regarding the chemical nature of the gene, the genetic code, and current ideas concerning gene action. The evidence is well assembled and presented in a readily accessible manner.

The book has been carefully written and great trouble taken to avoid scientific inaccuracies but, perhaps because of the complex nature of the subject matter, it is not light reading. Mention might have been made of allosteric activation (as distinct from inhibition), and more time spent on the effects of hormones in regulating gene activity (apart from work on insect larvae); the most convincing experimental evidence in favour of the Lyon hypothesis is not mentioned. However, apart from a few such small points, the book forms a very extensive coverage of the subject, and the author states quite clearly in which fields our knowledge is still far from complete, as for example the organization of chromosomes particularly with regard to their replication.

In summary, this is a scholarly presentation of the evidence for current beliefs concerning the mechanism of heredity. It fulfils an important need and should prove particularly valuable to University students and those concerned with teaching genetics.

ALAN E. H. EMERY

**Lüth, Paul.** *Schöpfungstag und Mensch der Zukunft: Die Entwicklung der modernen Genetik*. Düsseldorf-Köln, 1965. Eugen Diederichs Verlag. Pp. 350. Price DM 14.80.

THE AUTHOR, a German physician, describes in his preface how he had to learn human genetics as a medical student under Hitler and how he later on set out to clarify and purge his ideas. The result is a creditable book, which describes not only the historical development of genetics and evolutionary theory but also the racist and antisocial movements which were and still are a product of the misunderstanding and falsification of some of the results of those sciences. The English reader may find the book